Rivett

THE RIVETT No. 608 PRECISION BACK GEARED SCREW CUTTING LATHE is built to meet the demand for a bench lathe suitable for precision toolmaking, laboratory and scientific uses. The variety of work that can be done on it, its accuracy and the ease and fineness of its adjustments make it more economical to use than a larger lathe. It is endowed with three main attributes: precision, utility, and beauty. Precision is a fact, it being possible to turn or bore within one ten-thousandth part of an inch and to thread within one-half thousandth inch of lead in one foot. The design of every part is such that this precision is enduring. Lathes of inferior quality soon lose their exactness which is a point to bear

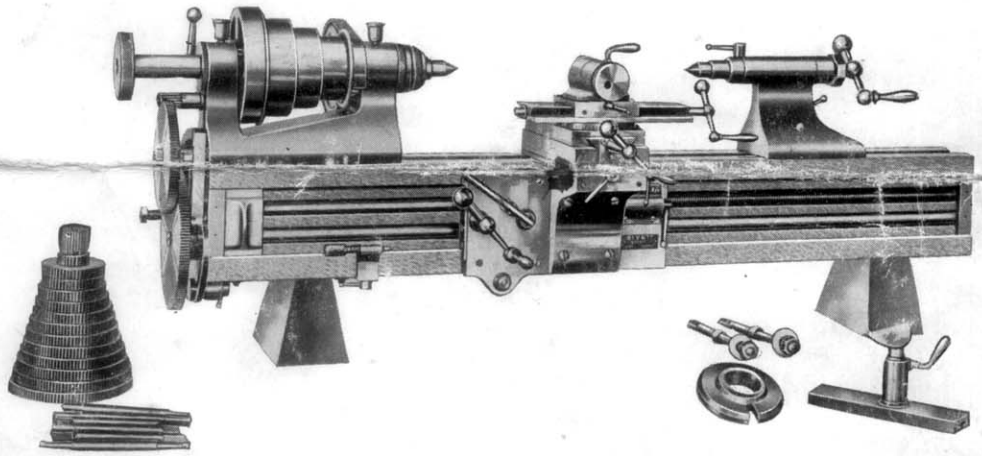

Fig. BH-1. **Rivett No. 608 Precision Back Geared Screw Cutting Lathe** with standard equipment, except less countershaft and treadles

in mind when selecting equipment. The utmost is given to the lathe by its many attachments which make it possible to do grinding, milling, relieving and a broad scope of special operations in addition to simpler work such as straight and taper turning, threading, boring and drilling. The lathe is beautifully finished to harmonize with its other high qualities. All bearing surfaces are hand-scraped and all non-bearing surfaces are polished. Its inspiring appearance can be maintained for a lifetime. One has confidence in his ability to do fine work when he stands before this Master Builder's master lathe. Perfect castings from America's leading foundry alone are used.

Typical bench lathe mounting and driving equipment is shown in pages following.

SPECIFICATIONS

HEADSTOCK	4NS 5/8" cap'ty	5C 1" cap'ty
Dia. of stock that can be passed through spindle	11/16"	1 1/8"
Dia. of stock that can be passed through collet	5/8"	1"
Dia. of thread on spindle nose (hard, ground)	1 5/8"	2 1/16"
Pitch of thread on spindle nose	12p.	10p.
Form of thread on spindle nose	USF	USF
Swing over bed, diameter	8 1/2"	8 1/2"
Swing over slide rest top slide	1 3/8"	1 3/8"
Swing over slide rest bottom slide	4"	4"
Back gear ratio	1:6 2/3	1:6 2/3

TAILSTOCK

Diameter of spindle . . . . . 1"
Diameter of taper at mouth of spindle . . . . . 0.541"
Travel of spindle 3 3/4

BED

Length . . . . . 40"
Distance between centers, tailstock flush . . . . . 18"
Distance between centers, tailstock overhanging . . . . . 21"

SLIDE REST

Travel of top slide of compound . . . . . 5 1/4"
Travel of bottom slide . . . . . 5 1/2"

The following attachments are made for the 608 lathe: Lever chuck closer. Cutting-off and forming slide. Threading dial. Translating gears for metric threads. Quick change gear box. External and internal grinding attachments. Knurling attachments. Slide rest and traverse milling attachments. Thread milling attachment. Relieving attachment. Ball turning rest. Slotting attachment. Spiral attachment. Taper attachment. Automatic indexing turret. Vise for slide rest, etc.

See Bulletin 608-A for full details
See Bulletin 100-A for collet and chuck equipment
See Bulletin 120-A for complete mounting and driving equipment

RIVETT PLAIN PRECISION BENCH LATHES, Series 505, are built to meet the demand for plain bench lathes suitable for precision toolmaking and accurate light manufacturing. The variety of work that can be done; the small floor or bench space occupied; the slight amount of power required; their high speed and the ease and fineness of adjustments make them more economical to use on small parts than larger lathes. In batteries, or singly, Rivett Bench Lathes are long-lived, uniform, and efficient producers. Correct in proportions they hold their accuracy — generous in size they withstand heavy cuts at high speeds. Precision ball-bearing preloaded headstocks for speeds up to 4600 R.P.M. (for tungsten-carbide tools) are available. Enclosed head type lathes, Fig. BH-8, are also offered.

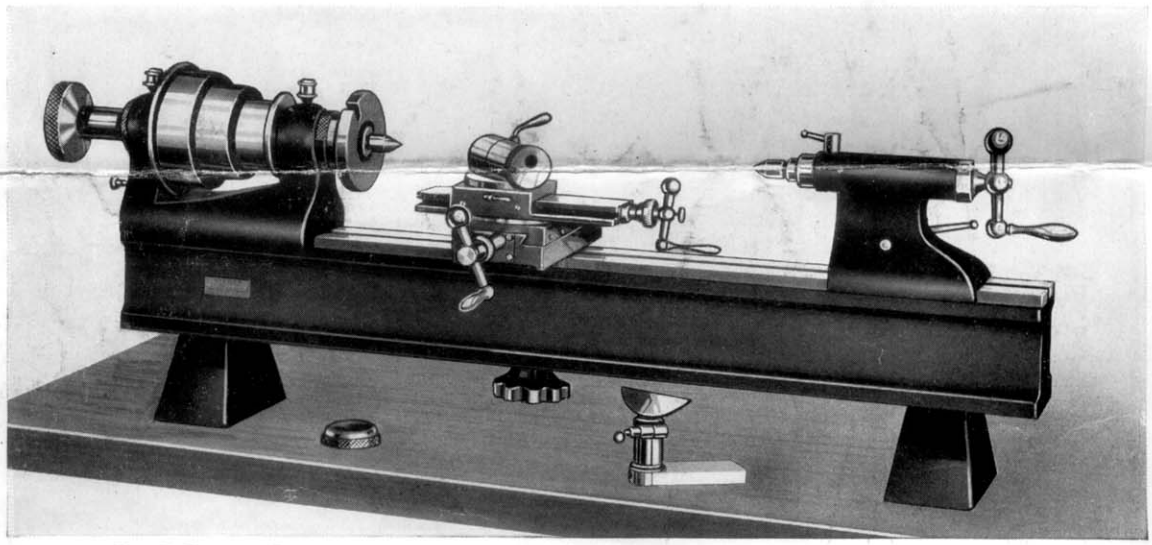

Fig. BH-2. **Rivett Plain Precision Bench Lathe,** Series 505. Built in five headstock sizes (See Specifications below)

RIVETT PRECISION BENCH LATHES are economically used for light manufacturing operations. Scientists use these lathes with their attachments for research and development work in medical, physical, astronomical and metallurgical laboratories.

Typical bench lathe mounting and driving equipment is shown in pages following.

SPECIFICATIONS

Lever Chuck Closers for all sizes of Heads are recommended. Slide Rests with either Rivett eccentric tool posts or rocker tool posts may be ordered.

	3NS	4NS	5NS	5C	6H
HEADSTOCK					
Diameter of stock that can be passed through spindle	9/16"	11/16"	15/16"	1 1/8"	1 1/4"
Diameter of stock that can be passed through collet	1/2"	5/8"	7/8"	1"	1 1/8"
Diameter of thread on spindle nose (hard, ground)	1 3/8"	1 5/8"	1 7/8"	2 1/16"	2 1/16"
Pitch of thread on spindle nose	12p.	12p.	10p.	10p.	10p.
Form of thread on spindle nose	USF	USF	USF	USF	USF
Swing over bed, diameter			8"		
Swing over slide rest top slide			1 3/8"		
Swing over slide rest bottom slide			4"		
Number of index holes in pulley			60		
Number of locking-pin holes in pulley			10		
TAILSTOCK					
Diameter of spindle			1"		
Diameter of taper at mouth of spindle			0.541"		
Travel of spindle			3 1/4"		
BED					
Length			38"		
Distance between centers, tailstock flush	19 1/2"	18"	17"	16 1/2"	16 1/2"
Distance between centers, tailstock overhanging	22 1/2"	21"	20"	19 1/2"	19 1/2"
SLIDE REST					
Travel of top slide of compound			5 1/4"		
Travel of bottom slide			5 1/2"		

See Bulletins 505-C and 505-D for full details
See Bulletin 100-A for collet and chuck equipment
See Bulletin 120-A for complete mounting and driving equipment

Rivett

RIVETT PLAIN PRECISION BENCH LATHES, Series 507, are lower in price than Rivett Series 505, and are of slightly lighter construction and plainer finish, but in all respects are high-grade and efficient machine tools. Newly designed, they incorporate the most modern bench lathe features. Their attachments are complete and convenient. For installation in batteries, their low price is particularly advantageous. They are also recommended to home mechanics and small experimental shops.

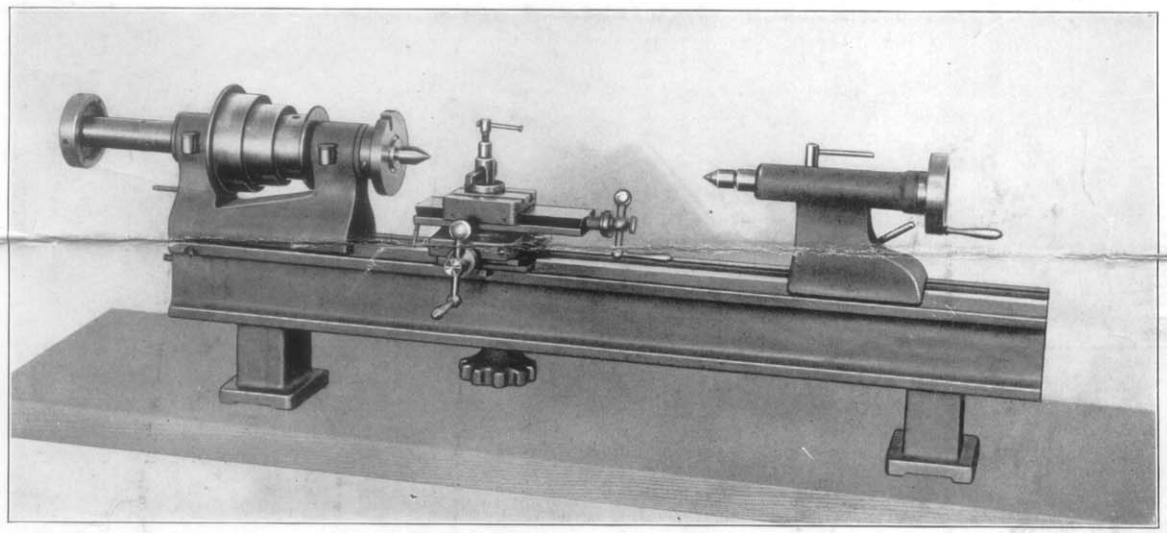

Fig. BH-3. **Series 507 Bench Lathe** with Plain Bearing Headstock, Screw Draw-in Spindle, Slide Rest and Plain Tailstock

Typical bench lathe mounting and driving equipment is shown in pages following.

SPECIFICATIONS

BED

Length	38″
Distance between centres, tailstock flush	17″
Distance between centres, tailstock overhanging	20″

HEADSTOCK

Diameter of hole in headstock spindle at its smallest portion	1″
Diameter of largest piece of round stock that can be passed through headstock held in jaw chuck	7/8″
Maximum diameter of round hole in collet	3/4″
Swing over bed, diameter	8″
Swing over top slide of compound slide rest, diameter	1 7/8″
Swing over top of bottom slide of compound rest, diameter	5″
Diameters of steps of cone pulley	3″, 3 3/4″, 4 1/2″
Width of belt	1/4
Number of index holes in headstock pulley	60
Taper of headstock spindle nose, included angle	5°
Diameter of taper at small end	1.7334″
Length of taper	7/8″

TAILSTOCK

Diameter of spindle	1″
Taper in mouth of spindle, special	3° approx.
Diameter of taper at mouth of spindle	0.541″
Travel of spindle	3 3/8″

SLIDE REST

Travel of top slide	5″
Travel of cross slide	4 3/8″
Upper surface of top slide	3 1/4″ x 3 1/4″
Height to top of top slide	3 1/16″
Slot in tool post, capacity	3/8″ x 1/2″

See Bulletin 507-B for full details

See Bulletin 100-A for collet and chuck equipment

See Bulletin 120-A for complete mounting and driving equipment

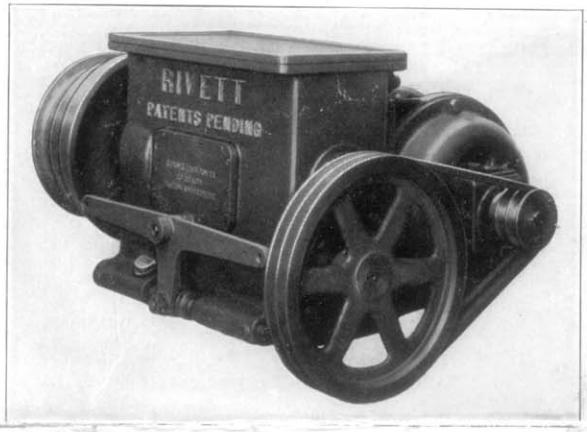

Fig. BH-4. **Speed Box Motor Drive** (Patents Pending)

THE SPEED BOX MOTOR DRIVE is a self-contained driving unit consisting of a constant speed motor, reduction gearing and cone pulley suitably designed to produce the ranges of speeds required for bench lathes and similar tools. Any desired ¾, or 1 H. P. motor is carried on a swinging plate pivoted to the rear face of the speed box with screw adjustment for maintaining proper tension of the double-V endless belts which drive to the speed box lower shaft. Belt sheaves are of sizes in proper ratio for the speeds required. Two pairs of helical-cut spur gears of different ratio, constantly in mesh, connect the lower and upper shafts. Either pair of gears may be selectively employed by action of a double-throw clutch operated by foot treadles or hand lever. Coil compression springs encased in the speed box housing throw the clutch to neutral and stop the lathe on release of the treadle or hand lever. The shafts are heat treated alloy steel running in Timken bearings. The gearing is of modern design and is noiseless and without vibration. The clutch is lined with a moulded composition providing smooth engagement of power and long life. The entire mechanism runs in a bath of oil and a filler gauge permits convenient renewal of lubricant and maintenance of level. The speed box is sealed at every point to prevent leakage of oil. A cover plate, easily removed, gives access to the clutch for adjustment.

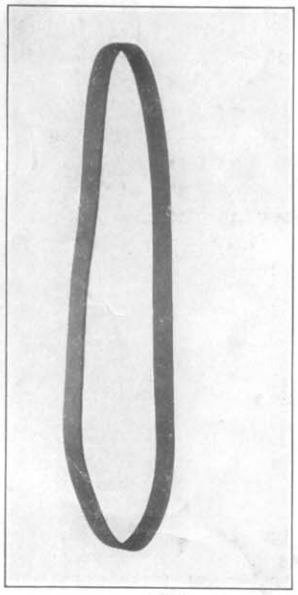

Fig. BH-5 **Endless Belt**

The upper shaft of the speed box carries a three-step driving cone pulley. Instant change from high speed to low or from low speed to high is available as above described and thus by belt shift on the three step cone pulley six speeds forward and, by use of reversing switch, six speeds backward are available. An endless leather or fabric belt which passes through opening in cabinet or bench top or oil pan is maintained at proper tension by adjustable jack pedestals on which the bench lathe is mounted.

Lathe Spindle Speeds, Speed Box Motor Drive

STYLE OF LATHE								
505 4NS	505 5NS	505 5C	505BB	507	608			
					BACK GEARS	OPEN BELT	BACK GEARS	OPEN BELT
1750 R.P.M. MOTOR					1750 RPM MOTOR		1140 RPM MOTOR	
REVOLUTIONS OF SPINDLE PER MINUTE								
300	200	200	800	240	45	300	40	118
395	265	285	1125	315	60	395	53	158
540	420	420	1625	430	80	535	70	210
900	600	600	2300	710	135	900	263	790
1185	850	850	3300	935	180	1180	346	1035
1615	1250	1250	4600	1270	240	1600	470	1400

THE ENDLESS BELT for cone pulley drive is easily kept at proper tension by adjustment of jack pedestals. A leather or fabric endless belt may be used. To apply a new belt, six screws are removed from the belt guard and the guard is slightly raised, exposing the opening in the bench or cabinet top through which the old belt is withdrawn and the new belt applied. When putting on new endless belt the lathe should be lowered by the jack pedestals to provide upward adjustment for belt tension.

The multiple endless V belt motor drive of the speed box unit, which is furnished with easy means for adjusting belt tension and for replacement, combined with the cone pulley endless belt drive completely saves the expense of time and production loss involved when lapping or hooking belts and avoids the impact of any belt joints, thus insuring a smooth-running transmission with full power.

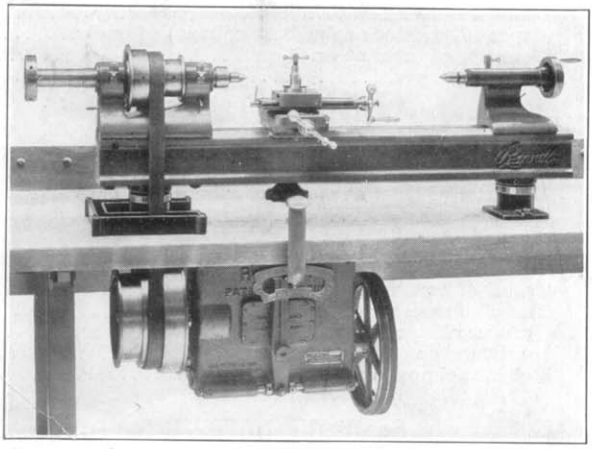

Fig. BH-6. Rivett Series 507 lathe on bench with **Speed Box Motor Drive**, hand lever control, **Jack Pedestals**, and **Belt Guard**

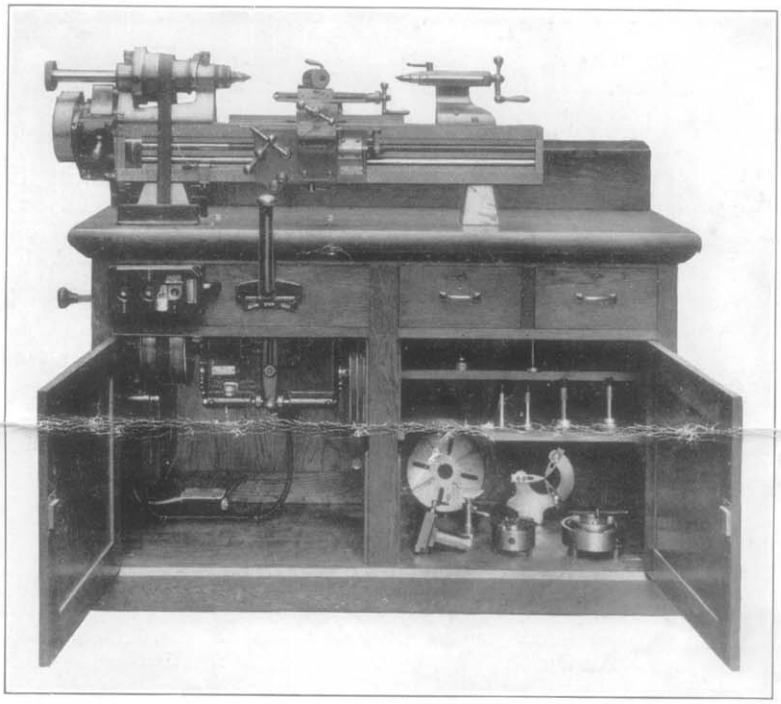

Fig. BH-7. Rivett 608 back-geared screw cutting lathe on cabinet with **Speed Box Motor Drive**, hand lever control

THE SPEED BOX being extremely compact is conveniently mounted in cabinet or under bench or oil pan. The unit is complete in itself and there are no component parts to align when mounting. As used in cabinet, the control is by hand lever, see Fig. BH-7. When this lever is moved to the left, the lathe is started in low speed range, or when moved to the right, in high speed range. The lever latches in either engaged position and returns to stop position automatically when released by a touch of the hand, body or knee of the operator. The lathe may be instantly reversed through push button magnetic switch with start, stop and reverse stations (Fig. BH-7). The rod with the knob, seen at left of illustration, shifts the belt on the driving cone pulley, the belt on headstock pulley being shifted by hand. The speed box in cabinet constitutes an almost completely noiseless and vibrationless power application, and the cabinet unit may be set anywhere, requiring only electrical connection. "Isolation" pads are used in assembling Rivett mounted units to absorb sound vibration.

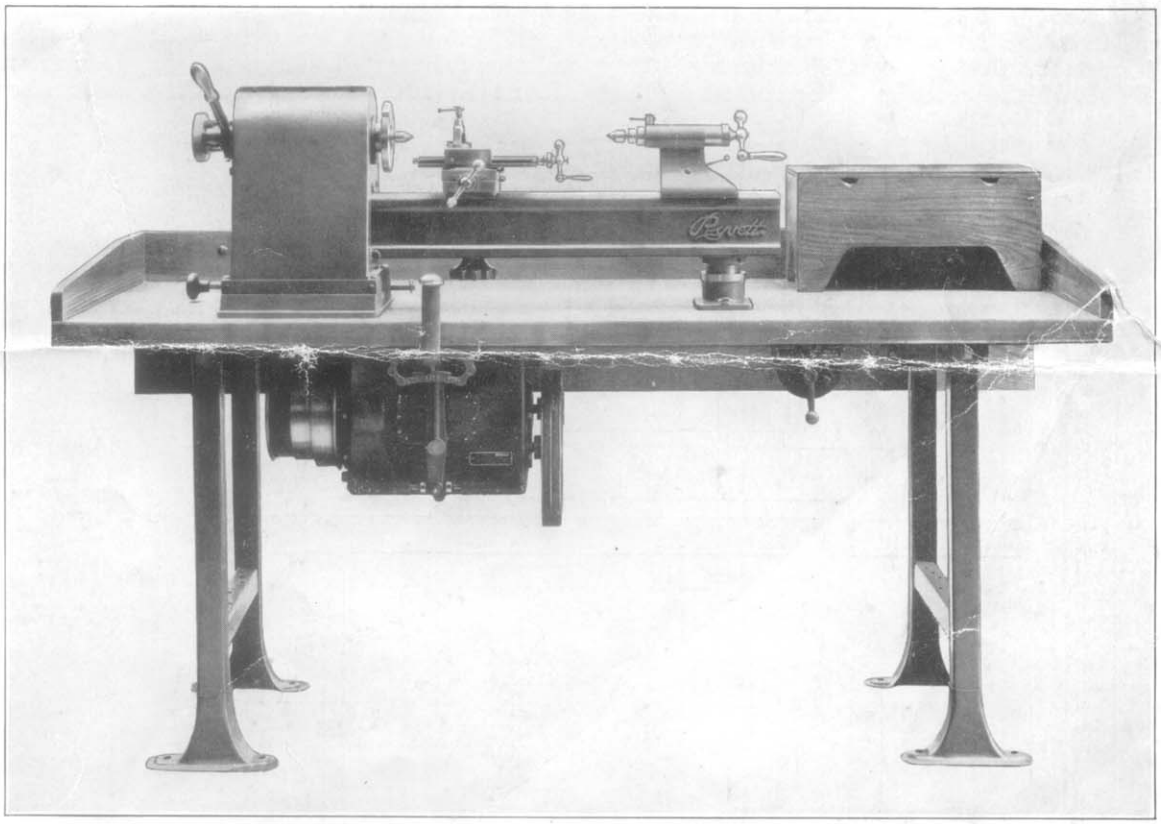

Fig. BH-8. Rivett Series 505 lathe, enclosed head type, with **Jack Pedestals** on unit bench with **Speed Box Motor Drive**, hand lever control

THE SPEED BOX on unit bench is illustrated in Fig. BH-8. The design of the enclosed head lathe permits the action of the jack pedestals in raising or lowering the lathe to maintain proper tension of endless headstock driving belt, the shifting of the belt and adjustment of bearings being effected through an opening in the casing. In all open or enclosed head lathes a new endless belt may be put on without disassembling headstock spindle or lifting lathe off bench or cabinet.

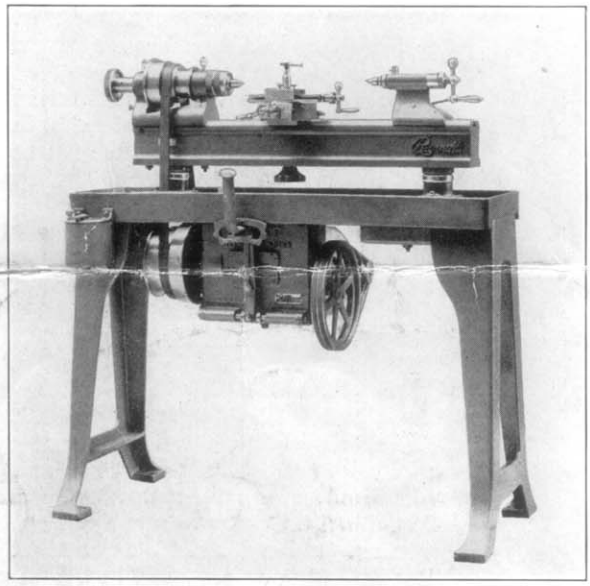

Fig. BH-9. Rivett Series 505, ball-bearing lathe on oil pan and floor legs with **Speed Box Motor Drive**, hand lever control and **Jack Pedestals**

THE SPEED BOX applied to oil pan mounting is seen in Fig. BH-9. A Rivett ball-bearing high speed lathe is shown. The speed box with standard 1750 R.P.M. motor drives the lathe up to 4600 R.P.M., giving necessary cutting speeds for efficient utilization of Tungsten Carbide tools for correct machining of average diameter work, and for correct machining of small diameter work with ordinary steel tools. The high speeds attainable with Rivett ball-bearing lathes are desirable for working brass and various synthetic materials. The speed box drives the lathe at maximum speed without vibration or noise.

THE JACK PEDESTAL consists of a base, threaded to receive the head on which the lathe bed rests. To adjust pedestals for cone belt tension the pedestal bolts are loosened, the locking screws released and the heads of the pedestals are turned, left-handed to raise the bed, by the use of a bar in the capstan holes. By turning both heads the same number of holes the level of the lathe is maintained. The tailstock pedestal is made with a spherical depression in its top in which rests a spherical washer carrying the bed. This design gives a *three-point bearing* to the lathe which guards against distortion. After desired adjustment has been made, the bolts which fasten the lathe to the cabinet or bench are tightened. The same tailstock jack pedestal is used for both enclosed type and open lathes. The headstock jack pedestal for enclosed type lathes has a curb which surrounds the belt opening and receives the lower end of the headstock. The headstock jack pedestal for open lathes is mounted with a belt guard, as shown in Fig. BH-6, which surrounds the belt opening and re-enforces the cut-away portion of the cabinet or bench.

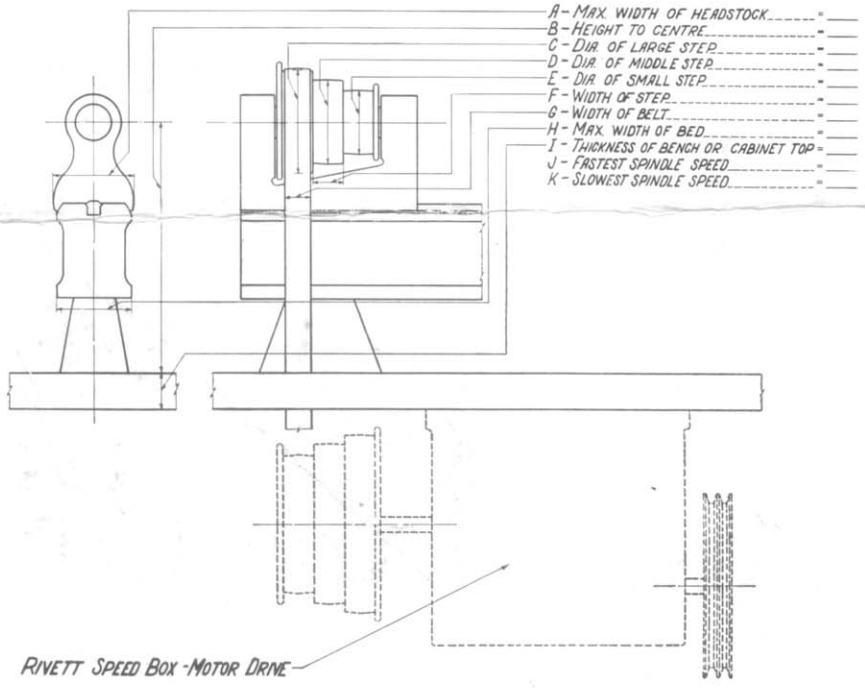
A - MAX. WIDTH OF HEADSTOCK
B - HEIGHT TO CENTRE
C - DIA. OF LARGE STEP
D - DIA. OF MIDDLE STEP
E - DIA. OF SMALL STEP
F - WIDTH OF STEP
G - WIDTH OF BELT
H - MAX. WIDTH OF BED
I - THICKNESS OF BENCH OR CABINET TOP
J - FASTEST SPINDLE SPEED
K - SLOWEST SPINDLE SPEED
RIVETT SPEED BOX - MOTOR DRIVE

Fig. BH-10. Diagram — Dimensions required to apply **Rivett Speed Box Motor Drive** to lathes

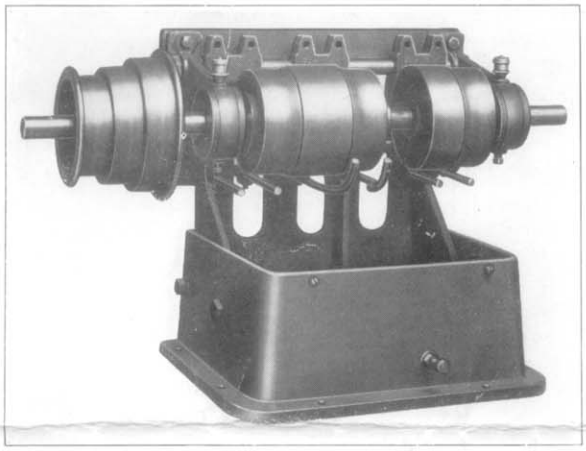

Fig. BH-11. **Horizontal Safety Drive Countershaft** ball-bearing, cover removed (Patented, June 19, 1929)

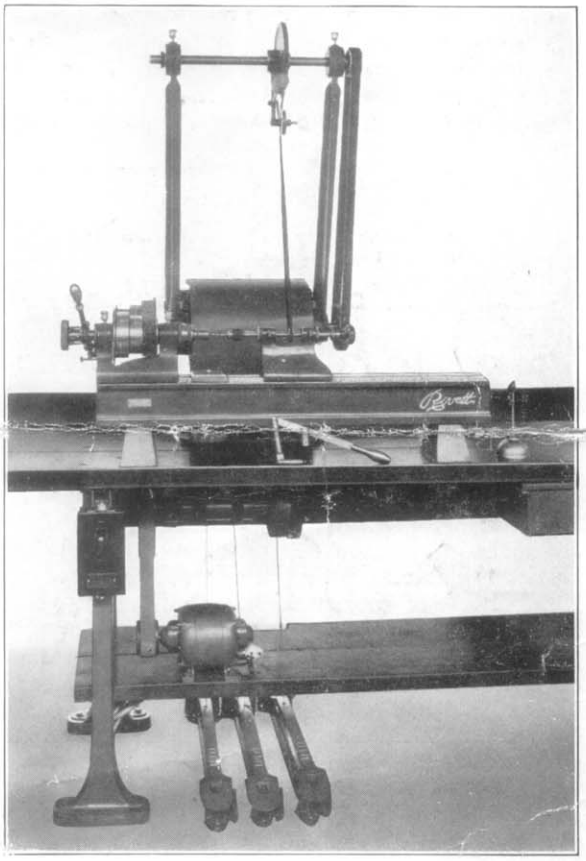

Fig. BH-13. Rivett Series 505 lathe on bench with **Horizontal Safety Drive Countershaft, Grinding Countershaft Attachment,** ball-bearing, and **Latch Treadles.** Weight of this grinding attachment countershaft 68 lbs.

THE HORIZONTAL SAFETY DRIVE COUNTERSHAFT may be used for driving all open and enclosed-head lathes. It is a ball-bearing countershaft carried on a bracket hinged to the belt guard and with a tension rod and nut which tighten both the horizontal cone belt and the vertical belts from the ball-bearing jackshaft, all of which may, therefore, have lapped and cemented joints. Exactly the right belt tension for adequate driving power, without undue load on bearings, is easily secured. After adjusting the belt tension, the countershaft base is rigidly locked to the belt guard, making a solid, steady construction. Economy in belting is obtained as the belts used are shorter than for overhead countershaft drives and, with cemented joints, will last for years. The countershaft has a removable sheet metal cover eliminating all danger. The horizontal safety drive countershaft may be driven from individual motor drive jackshaft, Fig. BH-12, or for group drive, from line shaft under bench. The advantage of direct mounting on bench or cabinet is obtained. With the ball-bearing grinding countershaft attachment, Fig. BH-13, over-head drives for grinding attachments, revolving spindle tailstock, etc., are available. Weight of horizontal safety drive countershaft only, Fig. BH-11, 108 lbs.

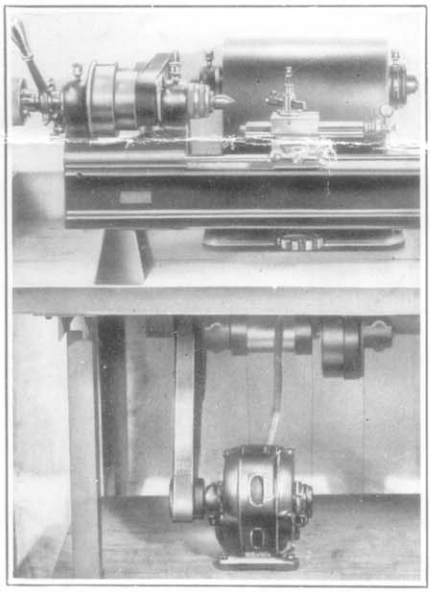

Fig. BH-12. Rivett Series 505 lathe on bench with **Horizontal Safety Drive Countershaft** and **Jackshaft**

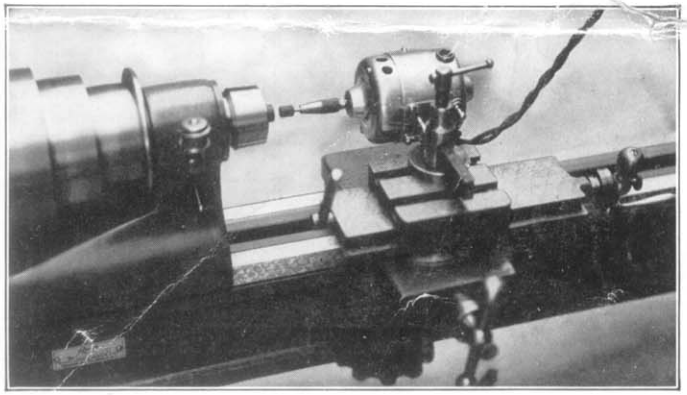

Fig. BH-14. **Electric Motor Slide Rest Grinding Attachment** — Convenient for internal and external work where lathe installation provides no overhead drive for regular grinding attachments. Cord attaches to lamp socket. Supplied for either 105-115 A. C. or D. C. or 220-230 A. C. or D. C. Specify voltage when ordering. Spindle speed is 20,000 R.P.M.

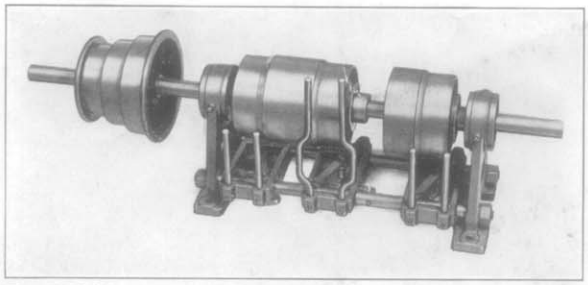

Fig. BH-15. **Wall or Ceiling Countershaft,** ball-bearing

THE WALL OR CEILING COUNTERSHAFT consists of three pairs of tight and loose pulleys providing two speeds forward and one reverse. It may be mounted on wall or ceiling or on plank carried by countershaft plank supports. See Fig. BH-16. The belt shifter forks are in universal arrangement providing for drives from above, horizontally or below. The shaft carries the driving cone pulley which may be on right or left of countershaft. Ball-bearings are used in journals and loose pulleys obviating the trouble attendant upon all plain-bearing countershafts. The pulleys are accurately balanced. Weight 57 lbs.

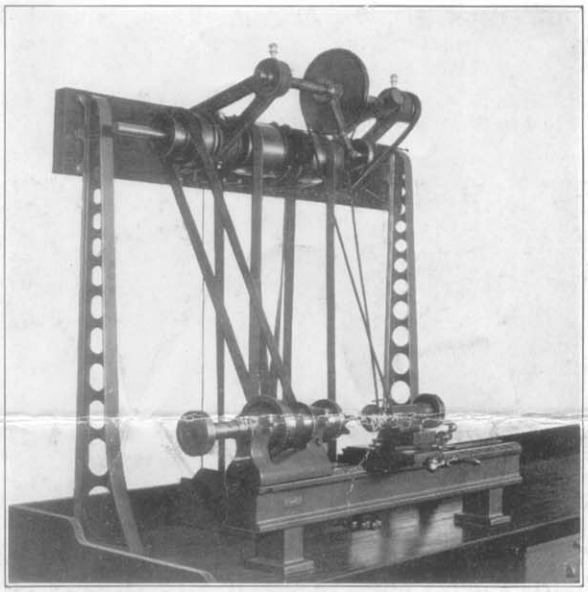

Fig. BH-16. Rivett Series 507 lathe, external grinding attachment, on bench with **Countershaft Plank Supports, Wall Countershaft** with **Grinding Countershaft Attachment,** ball-bearing

THE GRINDING COUNTERSHAFT ATTACHMENT bolts rigidly to the countershaft brackets and is driven by an endless belt from an outboard pulley carried on the countershaft. A swinging idler pulley, suitably weighted, maintains tension on the round belt used for driving grinding attachments, revolving-spindle tailstock, etc. The grooved driving pulley with its idler may be shifted endwise on its shaft to line up with the lathe attachments below. The shaft runs in ball bearings. Pulleys are accurately balanced. Weight 40 lbs.

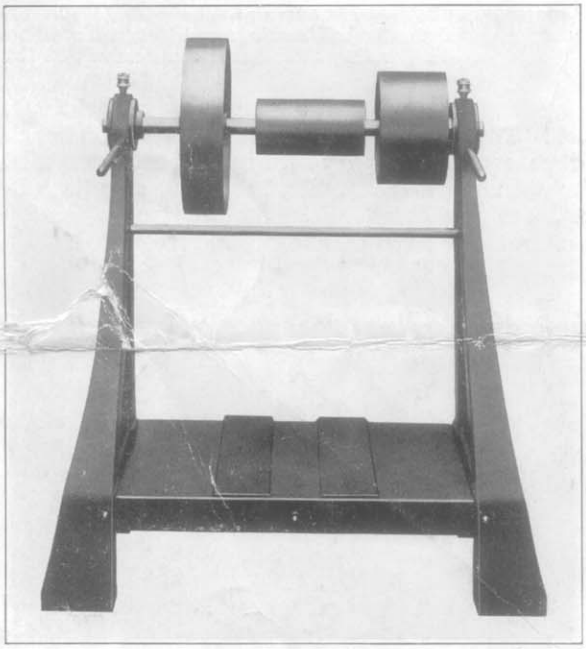

Fig. BH-17. **Individual Motor Drive Jackshaft,** ball-bearing

THE INDIVIDUAL MOTOR DRIVE JACKSHAFT consists of a motor platform with brackets carrying a shaft and pulleys identical with jackshaft, Fig. BH-18. Weight 187 lbs.

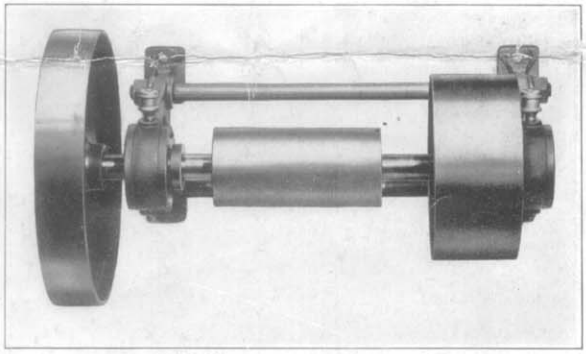

Fig. BH-18. **Jackshaft,** ball-bearing

THE JACKSHAFT carries a large pulley for motor belt, and two wide-faced pulleys for the three driving belts to countershaft. It is a ball-bearing unit which may be readily mounted in cabinet, under bench, or on plank supported on floor leg brackets back of oil pan. Weight 14 lbs.

Rivett

THE RIVETT 104 PRECISION INTERNAL GRINDING MACHINE is built to meet the demand for a small hole grinder suitable for precision tool making and accurate manufacturing. Its ease of setup, wide range of adjustment and its speed make it more economical to use on small holes within its range than a bulkier machine, whether in the tool room or production department. Rivett grinders are long-lived, uniform and efficient producers. Correct in proportion and design, they hold their accuracy.

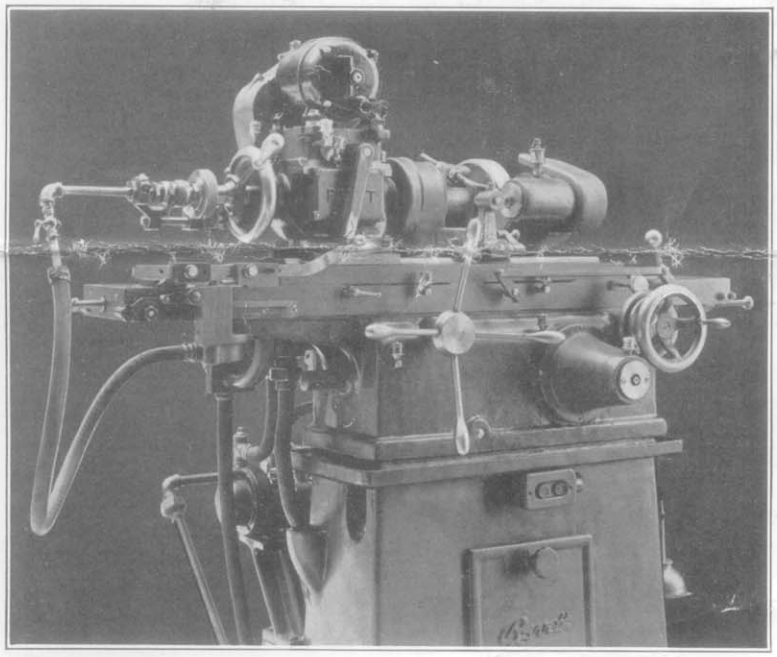

Fig. BH-19. **104-Grinder** with belt-driven **Internal Grinding Spindle Bracket, Spindle, Tip-over Diamond Holder** and **Lever Chuck Closer. Automatic Table Reciprocation, Work-head Start and Stop** and **Coolant Control, 3 H.P. Main Drive Motor; ¼ H.P. Work-head Motor, Standard Rivett Ball-bearing Grinding Spindle**

SPECIFICATIONS

Swing	8″
Table reciprocation, standard	2″
Table reciprocation, special	4″
Work-head swivels to	90°
Table swivels to	5°
Spindle takes collets	Rivett 4 N.S.
Round hole in collet, max.	5/8″
Capacity step chucks, max.	6
Spindle nose threads	1 7/8″ dia., 12 P., special U.S.F.
Travel of cross slide	1¾″
Bore of spindle bracket (for quill)	2½″
Speeds of work-head spindle	Selective
Speeds of grinding spindle	21,000, 25,000 and 30,000 R.P.M.
Speeds, unit motor drive spindle,	25,000 and 35,000 R.P.M.
Floor space	42″ x 66″
Net weight, with motors	1625 lbs.

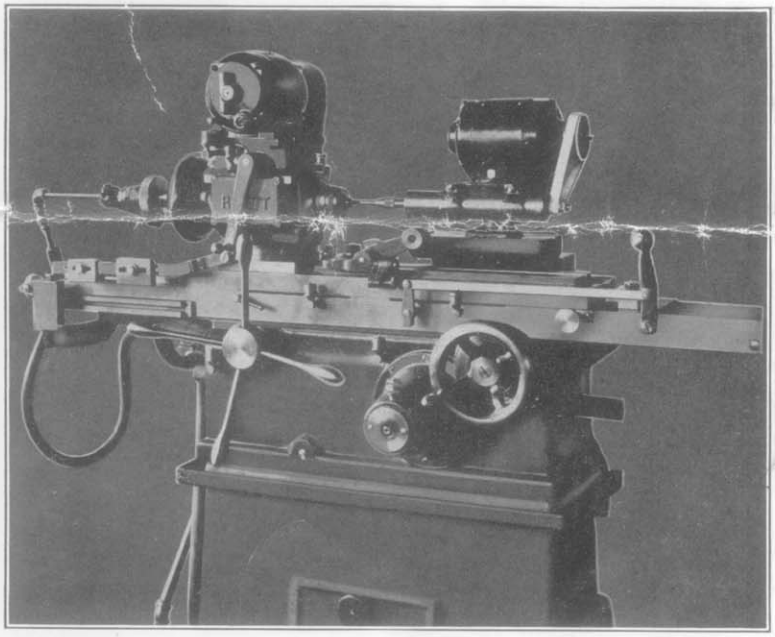

Fig. BH-20. **104-Grinder** with **Unit-Motor-Drive Spindle** with **Chuck** and **Mounted Grinding Wheel**, and **Tip-over Diamond Holder**

THE UNIT-MOTOR-DRIVE SPINDLE consists of a heavy base mounted on the cross slide of the grinder instead of the standard internal grinding spindle bracket and carrying the grinding spindle, belt-driven by a high speed motor mounted on the rear of the bracket. Rivett No. 104 grinders ordered with this unit have a simplified main drive requiring a 1 H.P. motor in place of the 3 H.P. furnished for the standard machine. The grinding spindle with the unit is supplied with chuck to hold mounted grinding wheels. For very small holes the unit is highly recommended.

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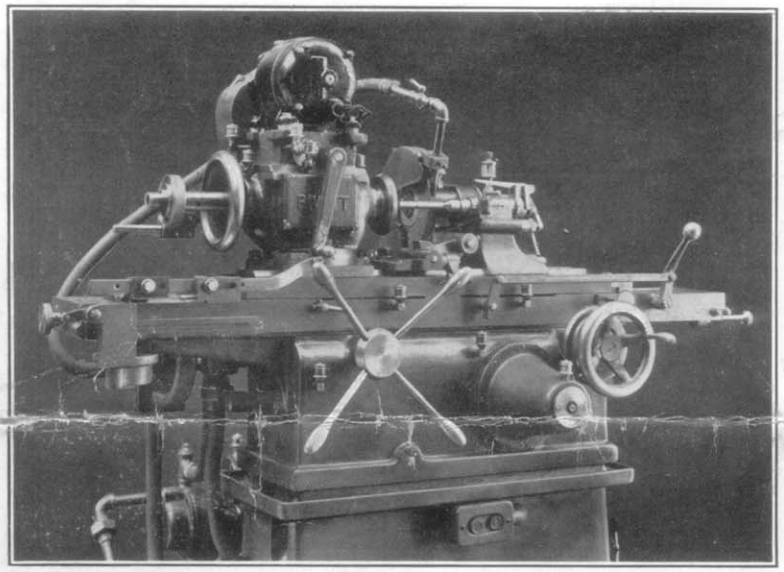

Fig. BH-21. **104-Grinder** with **External Grinding Attachment, Spring Lever Tailstock** and **Tip-over Diamond Holder,** set for grinding work, between centers, with standard **Screw Draw-in Spindle**

THE EXTERNAL GRINDING ATTACHMENT consists of a base or bracket fitting on the cross slide of the grinder in place of the internal grinding spindle bracket. The rear of the bracket carries a swinging countershaft which in addition to forming a part of the drive for the external grinding wheel spindle provides adjustment for belt tension. The spindle is of rigid design and runs in hard bronze bearings fully protected against entrance of foreign matter. The bearings are easily adjusted for wear. The wheel guard also constitutes a mounting for the grinding coolant supply nozzle. The spring-lever tailstock, used for grinding between centers, Fig. BH-21, mounts directly on the top part of the table and is fastened in any desired position by means of an eccentric binder. A lapped and cemented endless leather belt is recommended for the spindle drive. It will be seen that either the power table reciprocation of the grinder up to 2″, when machine is set for 2″ stroke, or up to 4″ on 4″ stroke machine, may be employed, or hand reciprocation by the pilot wheel for the full center distance of the grinder may be used. An external wheel with beveled edge of any required angle is convenient for grinding a straight diameter and a bevel at one setting. Suitable bevel wheel-forming fixtures are available. The drive provides correct surface speed of grinding wheel.

Work may be held in collets or step chucks operated by screw draw-in spindle or lever chuck closer when grinding between centers is not desirable, Fig. BH-22. Jaw chucks or special chucking fixtures mounted on the threaded work-head spindle nose are used for irregular shapes having straight or tapered diameters to be ground. For grinding tapers of not more than 10° included angle the upper table of the grinding machine is swiveled. For greater than 10° angles the work-head is swiveled.

The coolant supply system is readily disconnected from the hollow work-head spindle and connected with the nozzle carried by the wheel guard for external work.

The Rivett 104 Grinder with external grinding attachment is of the greatest value for innumerable fine grinding operations in the tool room, experimental laboratory or production department. The internal spindle bracket and the external grinding attachment are quickly interchanged and together constitute equipment for the widest range of duty. The work-head of the standard grinder, controlled by the push-button starter, is wired to run clockwise for internal grinding. When the external grinding attachment is ordered, a reversing switch should also be specified to interpose between the starter and the work-head motor to permit running the work-head anti-clockwise for external grinding.

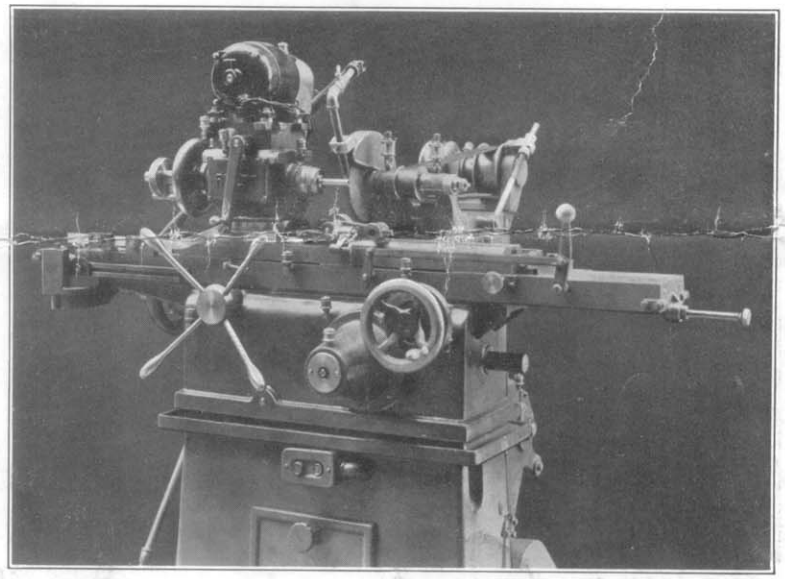

Fig. BH-22. **104-Grinder** with **External Grinding Attachment** and **Tip-over Diamond Holder,** set for grinding work held in collet

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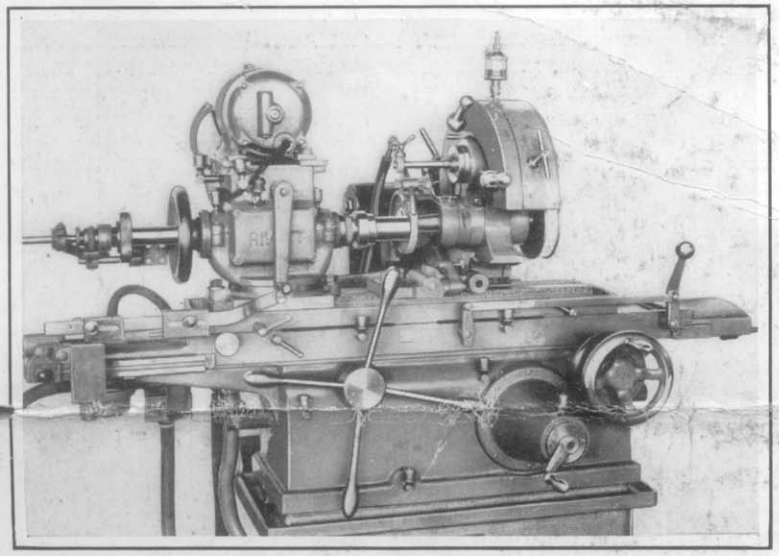

Fig. BH-23. **104-Grinder** with **Internal-External Turret Attachment, and Tip-over Diamond Holder**

THE RIVETT TURRET TYPE INTERNAL-EXTERNAL GRINDING ATTACHMENT is valuable for grinding external and internal surfaces at one chucking of the work, thus insuring absolute concentricity. In parts like jig bushings, where the holes must be absolutely central with the peripheries, and in revolving elements where the outside surfaces must run true with the holes, perfectly concentric work is assured by this simple and direct method. Much time is saved and greater accuracy is thus attained than by the common procedure of first chucking the piece and grinding the hole on an internal grinder and then mounting on an arbor of questionable truth and finishing the outside on an external grinder. One machine with turret type combination attachment and one chucking of the work finishes the piece.

The two-station vertical face turret mounts on the cross slide of the Rivett No. 104 Precision Grinder and carries an internal and an external grinding spindle, the quills being easily and securely clamped in position. A handle is provided for indexing the turret and a spring-actuated locking pin locates each spindle in correct position for work. Three substantial ball-handles rigidly clamp the turret in working positions. The driving pulleys are proportioned to give proper wheel speeds and to permit the use of a single endless belt for both internal and external grinding. When the turret is indexed, the tension of the belt is relieved, the belt transferred by hand from one spindle to the other and when the turret has reached its new position, proper tension has been applied to the belt. When one spindle is running, the other spindle is at rest thus saving power and avoiding danger from a free-running wheel. Lubrication is so arranged that oil is fed only to the spindle in working position.

Grinding coolant is supplied for the internal operation through the hollow work-head spindle, and for the external operation through a nozzle carried on the wheel guard.

The tip-over wheel truing or diamond fixture, which is a part of the regular equipment of the machine, is used for dressing both the external and internal wheels. All necessary guards are provided.

A reversing switch, referred to on previous page is furnished as regular equipment of 104 Grinders ordered with the turret-type attachments. It should be specified when turret attachments are separately purchased.

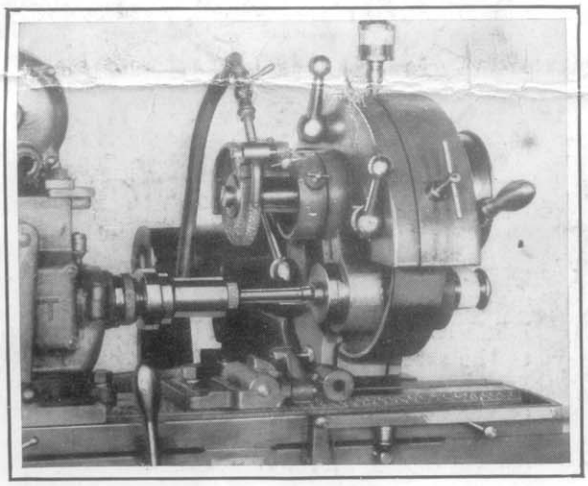

Fig. BH-24. **Turret Attachment** with **Internal Grinding Spindle** in grinding position

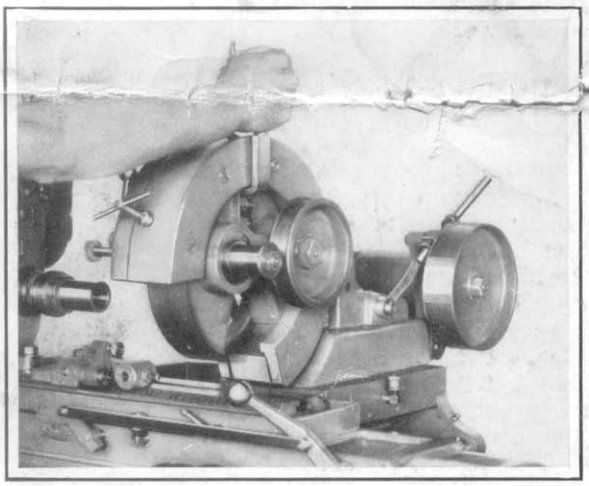

Fig. BH-25. **Turret Attachment** showing drive pulley and manner of indexing either internal or external grinding spindle

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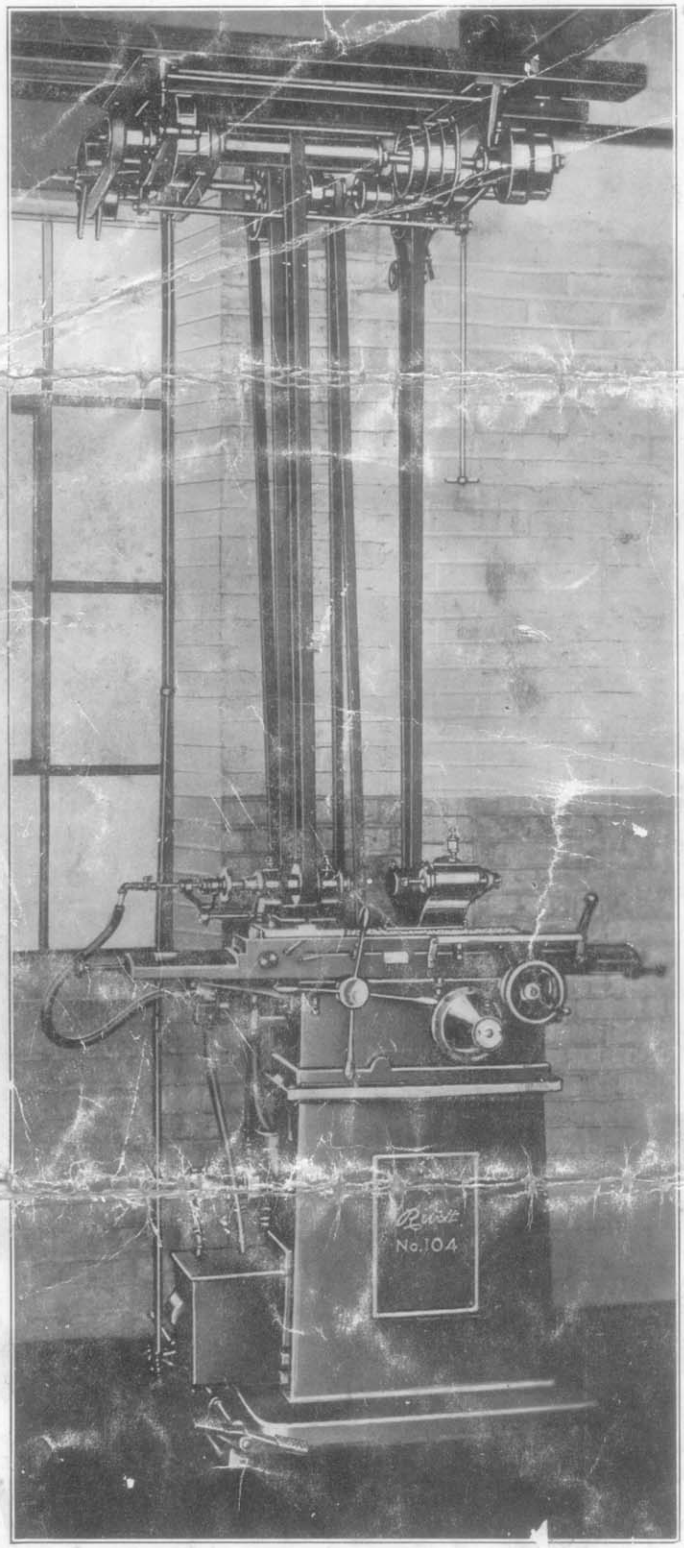

Fig. BH-26. **104-Grinder, countershaft-driven**

THE 104-GRINDER COUNTERSHAFT-DRIVEN is furnished in place of the standard motor-driven grinder when specified. Countershaft-driven grinders, like motor-driven machines, are supplied with either 2″ power table travel or 4″ power table travel as required. The main drive, work-head drive, internal grinding spindle drive or external attachment drive and pump drive are direct from the countershaft by vertical belts. The work-head is controlled by foot treadle. The countershaft itself is controlled by shifter rod. The countershaft is a ball-bearing unit with pulleys correctly balanced. Grinding coolant supply is automatically controlled as in the motor-driven grinder. In range, capacity and general characteristics the countershaft and the motor-driven machines are identical. The unit motor-drive spindle, Fig. BH-20, may be used on the countershaft-driven grinder if desired, or an air-driven grinding spindle may be mounted in the internal grinding spindle bracket.

SPECIFICATIONS

Speeds of work-head spindle, 250-500 R.P.M.
Speed of countershaft . . . . . 600 R.P.M.
Speeds of grinding spindle:
low range, 8,750, 11,750 & 16,000 R.P.M.
high range, 13,500, 18,500 & 25,000 R.P.M.
Floor space . . . . . 36″ x 66″
Net weight, including countershaft, 1450 lbs.

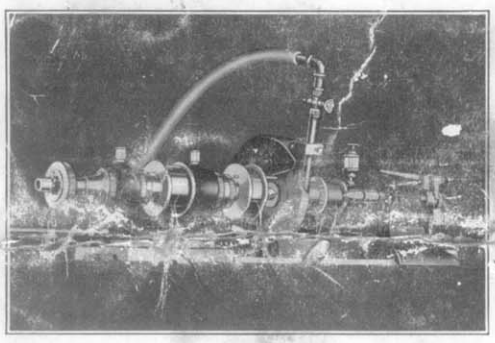

Fig. BH-27. **External Grinding Attachment** for countershaft-driven grinder

THE EXTERNAL GRINDING ATTACHMENT FOR COUNTERSHAFT-DRIVEN GRINDER, Fig. BH-27, is similar to the attachment furnished for the motor-driven machine except that its spindle is driven direct from the overhead countershaft and not through a swinging countershaft carried on the attachment bracket.

See Bulletin 104-B for full details and specifications